

LISTING OF CLAIMS

The listing of claims provided below replaces all prior versions, and listings, of claims in the application.

- 5 1. (Currently Amended) An apparatus for use in a chemical mechanical planarization (CMP) system, comprising;
- a head capable of being positioned at a proximate location over a polishing pad between a fluid delivery device and a wafer carrier, the head including,
- an input defined in the head, the input capable of delivering a fluid at the
- 10 proximate location and onto the surface of a polishing pad; and
- an output in the head, the output being oriented adjacent to the input, the output capable of removing at least part of the fluid delivered onto the surface of the polishing pad, wherein a plurality of the heads may be configured to span an application area.

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2. (Original) The apparatus of claim 1, wherein the head is moveable.

3. (Original) The apparatus of claim 1, wherein the head may contain a plurality of additional inputs and outputs.

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4. (Cancel)

5. (Original) The apparatus of claim 1, wherein the proximate location of the head over the polishing pad is between about 0.1 mm and about 1 mm.

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6. (Original) The apparatus of claim 1, wherein the input is formed in the head by one of milling, drilling, boring, and casting.

7. (Original) The apparatus of claim 6, wherein the input formed in the head may
5 include at least one conduit.

8. (Original) The apparatus of claim 1, wherein the fluid may be one of an abrasive-free chemically inert liquid, deionized water and a process indifferent fluid.

10 9. (Original) The apparatus of claim 1, wherein the output is capable of removing materials present on the polishing pad.

10. (Original) The apparatus of claim 10, wherein the materials on the polishing pad capable of being removed by the output may be one or a combination of slurry, de-
15 ionized water, isopropyl alcohol, particulates, abrasives, material residues, and pad residues.

11. (Original) The apparatus of claim 10, wherein removal of slurry adjusts a degree of planarization by the CMP system.

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12. (Original) The apparatus of the claim 1, further comprising a computer.

13. (Original) The apparatus of the claim 12, wherein the computer is capable of communication with a sensor located on the CMP system.

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14. (Original) The apparatus of the claim 13, wherein the sensor is capable of detecting material properties of a substrate including film thickness, conductivity, surface roughness, and topography height variations.

5 15. (Original) The apparatus of the claim 12, wherein the computer is capable of providing control over operation of the head.

16. - 19. (Cancel)

10 20. (Currently amended) An apparatus capable of controlling a chemical mechanical polishing (CMP) system, comprising;
a sensor;
a computer; and
a head capable of being positioned at a proximate location over a polishing pad,
15 the head including,
an input defined in the head, the input capable of delivering a fluid at the proximate location and onto the surface of a polishing pad; and
an output in the head, the output being oriented adjacent to the input, the output capable of removing at least part of the fluid delivered onto the surface of the polishing
20 pad, wherein a plurality of heads defined by two or more of the heads is configured to span an application area.

21. (Original) The apparatus of the claim 20, wherein the computer is capable of communication with the sensor located on the CMP system.

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22. (Original) The apparatus of the claim 20, wherein the sensor is capable of detecting material properties of a wafer surface being processed.

23. (Original) The apparatus of the claim 22, wherein material properties includes
5 film thickness, conductivity, surface roughness, and topography height variations.

24. (Original) The system of claim 20, wherein the sensor is an inductive sensor.

25. (Original) The apparatus of the claim 20, wherein the computer is capable of
10 providing control over operation of the head.

26. (Original) The apparatus of claim 20, wherein the head is connected to a movable arm.

15 27. (Original) The apparatus of claim 20, wherein the head contains a plurality of additional inputs and outputs.

28. (Cancel)

20 29. (Original) The apparatus of claim 20, wherein the proximate location of the head over the polishing pad is between about 0.1 mm and about 1 mm.

30. (Original) The apparatus of 20, wherein the input formed in the head may include at least one conduit.

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31. (Original) The apparatus of claim 20, wherein the fluid may be one or a combination of an abrasive-free chemically inert liquid and deionized water.

32. (Original) The apparatus of claim 20, wherein the output is capable of
5 removing materials present on the polishing pad.

33. (Original) The apparatus of claim 32, wherein the materials on the polishing pad capable of being removed by the output may be one or a combination of slurry, deionized water, isopropyl alcohol, particulates, abrasives, material residues, and pad
10 residues.

34. (Original) The apparatus of claim 32, wherein removal of slurry adjusts a degree of planarization by the CMP system.

15 35. (Currently Amended) An apparatus for use in a chemical mechanical planarization (CMP) system, comprising;

a plurality of heads head capable of being positioned at a proximate location over a polishing pad between a fluid delivery device and a wafer carrier, each ~~the~~ head including,

20 an output defined in the head and capable of being positioned at the proximate location over the polishing pad, the output being configured to enable removal of a material present on the surface of the polishing pad; and

an input defined in the head and capable of being positioned at the proximate location over the polishing head, the input capable of delivering a fluid to the surface of
25 the polishing pad to at least partially replace the material that is configured to be removed by the output, the output being positioned on the head adjacent to the input.

36. (Currently amended) The apparatus of claim 35, wherein each ~~the~~ head is moveable.

5 37. (Original) The apparatus of claim 34, wherein the proximate location of the head over the polishing pad is between about 0.1 mm and about 1 mm.

38. (Original) The apparatus of claim 35, wherein the material present on the surface of the polishing pad may be one or a combination of slurry, de-ionized water,
10 isopropyl alcohol, particulates, abrasives, material residues, and pad residues.

39. (Original) The apparatus of claim 35, wherein the fluid may be one of an abrasive-free chemically inert liquid, deionized water and a process indifferent fluid.

15 40. (Original) The apparatus of the claim 35, further comprising a computer capable of communication with a sensor located on the CMP system.

41. (Original) The apparatus of the claim 40, wherein the sensor is capable of detecting material properties of a substrate including film thickness, conductivity, surface
20 roughness, and topography height variations.

42. (Currently amended) The apparatus of the claim 40, wherein the computer is capable of providing control over operation of each ~~the~~ head.